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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/361,458	07/27/1999	JONATHAN H. MEIGS	30-4590	5541

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EXAMINER

EASTHOM, KARL D

ART UNIT	PAPER NUMBER
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2832

DATE MAILED: 10/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/361,458

Applicant(s)

MEIGS ET AL.

Examiner

Karl D Easthom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11,30-35 and 37-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11,30-35 and 37-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 11, 30-35 and 37-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carbin in view of, or with, Grazen and Hunt, further in view of Ameen. Carbin discloses the claimed invention except the alumina oxide and nickel particles and the silane roughening treatment. Grazen discloses nickel and alumina as a good conductor material (electrical contacts, electric relays) in the claimed range with the articles having good wear resistance, corrosion resistance, alloy strength, high temperature resistance, and a host of advantages at cols. 1-2. Hunt discloses at col. 24, lines 24-67, the same mixture of alumina and nickel as a useful resistor in a circuit board on a copper foil similar to the resistor and circuit board of Carbin noted next. Carbin discloses that metals codeposited with nonmetals, similar to that of Grazen and Hunt, are typical of the prior art for use as resistors in circuit boards, citing US 4808967 at col. 4, lines 15-21, teaching a nickel-phosphorous resistive layer, and also specifically teaches use of nickel as a conductive layer¹. Carbin also teaches that deposition can occur on either the matte side or shiny side at col. 5, lines 5-32, thus suggesting that any resistive or conductive materials such as that of Grazen or Hunt are applicable for deposition on the shiny side. That is, Carbin teaches at the noted passage and see cols. 9-11 that there are only two choices for deposition, the shiny side or the matte side, teaching a copper layer in a

¹ Phosphorous is a known resistance increasing additive, see Clouser et al., similar to the function of the alumina.

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circuit board (for claims 38 and 48) with advantages for deposition on the shiny side including the ability to better etch the conductor layer - see top of col. 11 due to the deeper pits in the matte side. Carbin teaches that the shiny side lacks adhesion to a substrate due to lack of roughness, and employs an adhesion layer on the shiny side prior to a subsequent metal deposition that creates roughness (that is transferred to the deposited metal layer -see col. 5, lines 50-57) for better adherence, suggesting the claims. Ameen discloses that one way to make the surface of either the matte or shiny side rougher is to use a silane treatment, so than it would have been obvious to use the known method where Carbin teaches using the method. It would have been obvious in view of Grazen and Hunt to employ the known resistive materials suggested there in the circuit board of Carbin on the shiny side for the purpose of forming a known resistor composition having the superior properties suggested, and so that the copper layer can be etched more easily, and to use the silane treatment of Ameen where Carbin teaches using a roughening treatment to enhance adhesion.

Assuming arguendo for the dependent claims that the process limitations render the product distinct (and if not then the required modifications are not required) , for claims 31 and 33, the claimed temperature range is disclosed at col. 3, lines 50-75 of Grazen where the claimed temperature range is required for the materials employed so that would have been obvious. Grazen suggests and discloses the claimed particle size, g/l, and PH of claims 30-33 (after conversion of units from oz/gal for nickel) at col. 4, lines 50-75 chosen for the ability to circulate in the solution rendering that choice also obvious. For the density of alumina, the alumina additive is disclosed at Grazen col. 5, lines 25-35 as varied over a wide range depending on the desired result. The amount in g/l is further suggested in the examples at col. 4 Hunt teaches, and

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it is well known as evidenced by art in the record, that the relative amount of metal to additive varies the resistivity so that it would have been obvious to employ any range to obtain any resistance, meeting claims 11, 43, , and 47. The materials of Hunt and Degrazen also meet claims 37, 39-42, 45.

3. Claims 37-45 and 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carbin in view of Hunt, further in view of Ameen. Carbin discloses the claimed invention as noted above except the nonconductive material and the silane roughening treatment. Hunt discloses at col. 24, lines 24-67, nonconductors and conductors as a mixture, including the mixture of alumina and nickel as a useful resistor in a circuit board similar to the resistor and circuit board of Carbin noted next (thus meeting claims 39-45 and 47). Carbin discloses that metals codeposited with nonmetals, similar to that of Hunt, are typical of the prior art for use as resistors laminated with copper layers in circuit boards (meeting claims 38 and 48, citing US 4808967 at col. 4, lines 15-21, teaching a nickel-phosphorous resistive layer, and also specifically teaches use of nickel as a conductive layer). Carbin teaches adhesion treatment to adhere conductors to a substrate due to lack of roughness, and employs an adhesion layer that creates roughness -see col. 5, lines 50-57 for better adherence, suggesting the claims. Ameen teaches as noted above, the particular silane treatment for roughness so that it would have been obvious to employ that for reasons noted. For claims 43, 44 and 47, the area and resistivity are met by forming the composition of particles, or the resistivity is obvious as a known variable controlled by conductor to nonconductor ratio.

4. Claims 37-44 and 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carbin in view of Kakuhashi 52-181559 (English translation) (see note 1), further in view of

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Ameen. Carbin discloses the claimed invention except the silane treatment and non-conductive material. Kakuhashi disclose the material as a good resistor for electroplating circuit boards at page 3, and useful to replace the nickel/phosphorous taught by Carbin in order to make a larger sheet resistance, so that it would have been obvious to employ same. For the discussion of Ameen and Carbin relating the silane treatment see the remarks above, not repeated here for brevity but incorporated by reference. For claims 39-44, the Kakuhashi materials meet the claims. For claims 38, 46, and 48 Carbin as noted above or Kakuhashi at example 1 discloses the copper foil and electrodeposition and substrate.

5. Applicant's arguments filed 9/2/04 have been fully considered but they are persuasive only as to O'Bryan. Applicant argues that Grazen is nonanalogous art as not applicable to resistors on multilayer foils. This is not correct since Grazen discloses what is essentially a conductor foil albeit as a contact. Each reference deals with thin metal layers used as resistors or conductors. This is the art which pertains. That Hunt or Carbin do not teach the silane treatment to attach the resistor to the conductor is not persuasive. A resistor is another metal layer, and as noted, by applicant, Carbin teaches that a copper foil surface can be treated to improve adhesion of another metallic layer to the copper foil. The adhesion treatment also promotes adhesion to the substrate as suggested. Further, the specific resistor of Carbin comprises nickel, and one of the conductors is nickel, with the only difference being the addition of a small amount of alumina. The alumina and nickel combination is a well known resistive material. Hence the addition of a nonmetal to the metal layer does not alter the teaching, because there is no teaching that the nonmetal will promote adhesion so that adhesion treatment is not required, so that adhesion promotion is still desired. Applicant argues that Carbin does not

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teach addition of a nonmetal with a metal, but this is not correct because phosphorous is a nonmetal, and nickel is a metal, and Carbin teaches it is known to apply that to a copper surface in a circuit board. The assertion that an oxide layer is an adhesion promoter but does not improve or promote adhesion is not understood. As to Ameen, Ameen is employed to show that silane treatment is known for promoting adhesion by improving roughness, and Carbin teaches improving adhesion by promoting roughness. Thus, the suggestion is as noted. As to the resistivity limitations, same are inherent in the proper proportions of the claimed materials and obvious for the reasons noted.

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl D Easthom whose telephone number is (272) 571-1989. The examiner can normally be reached on M-Th, 5:30AM-4:00PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on (272) 571-1989. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Karl D Easthom
Primary Examiner
Art Unit 2832

KDE